

REMARKS

Reconsideration of the above-identified application in view of the foregoing amendments and following remarks is respectfully requested.

A. Status of the Claims and Explanation of Amendments

Claims 1-15 and 17-26 were previously pending. By this paper, the specification is amended to address several typographical errors. Also, claims 1 and 20 are amended to further recite the polymeric or composite membrane is “integral” and “substantially air impermeable,” and that the polymeric sheet has a “microstructure of fibrils.” Support for these claim amendments is found throughout the application as originally filed, including for example page 5, lines 6-13, page 6, lines 4-11, page 7, lines 16-20, page 16, lines 8-15 and Figure 4.

Formerly dependent claim 10 has been amended into independent form. Independent claim 18 has been amended to incorporate the subject matter of dependent claim 19, which is now cancelled without prejudice or disclaimer.

No new matter will be added to this patent application by entry of these claim amendments. Entry is requested.

Two double patenting rejections were lodged in the office action. First, pending claims 1 and 17 were rejected pursuant to 35 U.S.C. § 101 as allegedly claiming the “same invention” as that of claim 1 of prior U.S. Patent No. 6,635,384 to Bahar (“Bahar ’384 patent”). [2/1/06 Office Action at p. 3]. Second, pending claim 1 also was rejected under the judicially created doctrine of “obviousness-type” double patenting over

claims 1 and 5 of U.S. Patent No. 6,242,135 to Mushiake (“Mushiake”). [2/1/06 Office Action at p. 2]. These rejections are traversed as explained *infra* at page 10, since there are differences in the scope of the pending claims and the previously issued claims, and the office action has not met its burden of showing that these differences are merely obvious variations. Moreover, there are no allowed claims in the present application and therefore Applicants request that any such double patenting rejections be held in abeyance until such time.

As to the merits, all of the pending claims were alleged to be anticipated or obvious. Claims 1-2, 12, and 20 were rejected pursuant to 35 U.S.C. § 102(b) as allegedly being anticipated by International Patent Application No. WO91/14021 to Kato et al. (“Kato”) [2/1/06 Office Action at pp. 3-4]. Claims 1, 3, 8, 10-15, and 17-26 were rejected pursuant to 35 U.S.C. §§ 102(b) or 103(a) as allegedly being anticipated by or alternatively unpatentable over European Patent Publication No. 0 503 147 to Ohashi et al. (“Ohashi”). [2/1/06 Office Action at pp. 4-5]. Claims 3, and 6-9 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ohashi in view of Great Britain Patent No. 2 009 788 to Laconti et al. (“Laconti”). [2/1/06 Office Action at p. 5]. Claims 4-5 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ohashi in view of U.S. Patent No. 5,147,722 to Koslow (“Koslow”). [2/1/06 Office Action at pp. 5-6]. These rejections on the merits are traversed since the four cited references do not teach, disclose or suggest all of the elements of Applicants’ claims.

B. The Double Patenting Rejections Should be Withdrawn

The rejection of claims 1 and 17 for “same invention”-type double patenting over claim 1 of the Bahar ’384 patent is respectfully traversed.

A rejection of “same invention”-type double patenting requires more than mere similarity. It requires that the pending and patented claims be drawn to *identical* subject matter. See MPEP § 804 (at 800-20) (citing *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957)). As the office action itself notes such a rejection should be withdrawn where the pending and conflicting claims “are no longer coextensive in scope.” [2/1/06 Office Action at p. 3]. As set forth in MPEP § 804 (at 800-20), “[a] reliable test for double patenting under 35 U.S.C. 101 is whether a claim in the application could be literally infringed without literally infringing a corresponding claim in the patent.” See also *In re Vogel*, 422 F.2d 438, 164 USPQ 619, 622 (CCPA 1970) (“A good test ... is whether one of the claims could be literally infringed without literally infringing the other.”)

As shown below, pending claim 1 is not identical to or coextensive with claim 1 of the Bahar ’384 patent:

Pending Claim 1

1. An integral, substantially air impermeable polymeric membrane for use in an electrochemical apparatus or process comprising:

Claim 1 of the Bahar ’384 patent

1. A composite membrane for use in an electrochemical apparatus or process comprising:

Pending Claim 1

- a) a polymeric sheet comprising polymer and having a porous structure,
- b) the polymeric sheet having distributed in the polymer: i) inorganic particulate; ii) metal; iii) an organic polymer; or iv) a combination thereof, and
- c) said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process.

Claim 1 of the Bahar '384 patent

a polymeric sheet comprising polymer and having a porous structure, said polymeric sheet having distributed in the polymer: inorganic particulate, metal: an organic polymer: or a combination thereof, and said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process;
wherein said membrane is disposed between two fuel cell electrodes, wherein, said membrane provides a steady state current of at least 1.178 amps/cm² at 0.5 volts, with no humidification of incoming fuel cell air and hydrogen reactants, with air and hydrogen feed both at 40 psig and 25° C., and the fuel cell temperature at 50° C.

The final two elements of claim 1 of the Bahar '384 patent are not recited in pending claim 1. Moreover, pending claim 1 recites that the polymeric membrane is "integral" and "substantially air impermeable."

Pending claim 17 is a dependent claim that incorporates the claim elements of claims 1 and 15. Pending claim 17 is not identical to or coextensive with claim 1 of the Bahar '384 patent:

Pending Claim 17

1. An integral, substantially air impermeable polymeric membrane for use in an electrochemical apparatus or process comprising:

a) a polymeric sheet comprising polymer and having a porous structure,
b) the polymeric sheet having distributed in the polymer: i) inorganic particulate; ii) metal; iii) an organic polymer; or iv) a combination thereof, and

c) said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process.

15. The membrane of claim 1, wherein the membrane is disposed between two fuel cell electrodes.

17. The membrane of claim 15, wherein the polymeric sheet has a thickness of less than 38 microns, and wherein the membrane that is disposed between said two electrodes of a fuel cell provides a steady state current of at least 1.78 amps/cm² at 0.5 volts, with no humidification of incoming fuel cell air and hydrogen reactants, with air and hydrogen feed both at 40 psig and 25° C, and the fuel cell temperature at 50° C.

Claim 1 of the Bahar '384 patent

1. A composite membrane for use in an electrochemical apparatus or process comprising:

a polymeric sheet comprising polymer and having a porous structure,
said polymeric sheet having distributed in the polymer: inorganic particulate, metal; an organic polymer; or a combination thereof, and

said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process;

wherein said membrane is disposed between two fuel cell electrodes,

wherein, said membrane provides a steady state current of at least 1.178 amps/cm² at 0.5 volts, with no humidification of incoming fuel cell air and hydrogen reactants, with air and hydrogen feed both at 40 psig and 25° C., and the fuel cell temperature at 50° C.

Pending claim 17 includes claim elements not found in claim 1 of the Bahar '384 patent, i.e., "an integral, substantially air impermeable polymeric membrane" and "the polymeric sheet has a thickness of less than 38 microns."

In light of the differences between pending claims 1 and 17 and claim 1 of the Bahar '384 patent shown above, it is surely true that one of the claims could be literally infringed without literally infringing the other. Said another way, the scope of pending claims 1 and 17 differs from the scope of claim 1 of the Bahar '384 patent. As such, the "reliable test" for double patenting under 35 U.S.C. § 101 shows that the "same invention" double patenting rejection should be withdrawn as to pending claims 1 and 17.

As to the rejection of claim 1 for "obviousness-type" double patenting over claims 1 and 5 of Mushiake, this rejection also is traversed because the pending claims have not been shown to be obvious variations of the specified claims of Mushiake. Again, Applicants note that the present application is related to U.S. Patent Application Serial No. 08/928,207 (which ultimately issued as Mushiake), and claims priority to this earlier application as a division.

Although the analysis employed in an obviousness-type double patenting rejection parallels the guidelines for analysis of a 35 U.S.C. § 103 obviousness determination, no such analysis was provided by the office action. *In re Braat*, 937 F.2d 589, 19 USPQ2d 1289 (Fed. Cir. 1991); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985). This analysis includes an identification of any admitted differences, and an explanation of any alleged motivation to modify. If this rejection is maintained, a more complete analysis is respectfully requested.

In any case, there are numerous differences between pending claim 1 and claims 1 and 5 of Mushiake. Applicants' pending claim 1 incorporates inorganic

particulate, metal, organic polymer or combinations thereof, while the Mushiake's claims 1 and 5 are limited to metal oxide. Moreover, Applicants' pending claim 1 "distributes" these materials "in the polymer." Applicants' Example 3 illustrates this concept, and describes addition of fumed silica to a polytetrafluoroethylene (PTFE) aqueous dispersion followed by extrusion and expansion. By contrast, Mushiake's claims 1 and 5 involve a surface coating of the metal oxide. The office action does not explain why it would have been obvious to one of ordinary skill in the art to modify the structures of claims 1 and 5 of Mushiake to achieve the subject matter of pending claim 1. Accordingly, withdrawal is requested.

C. Claims 1-15 and 17-26 are Patentably Distinct from the Cited References

The rejections of pending claims 1-15 and 17-26 also are respectfully traversed. The references taken alone or in combination fail to teach, disclose, or suggest all of the claimed features, and proper motivation to combine the various references to arrive at Applicants' claimed inventions is lacking.

Applicants' claim 1 recites:

1. An integral, substantially air impermeable polymeric membrane for use in an electrochemical apparatus or process comprising:
 - a) a polymeric sheet comprising polymer and having a porous structure with a microstructure of fibrils,
 - b) the polymeric sheet having distributed in the polymer:
 - i) inorganic particulate;
 - ii) metal;
 - iii) an organic polymer; or
 - iv) a combination thereof, and

c) said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process.

1. Kato Does Not Anticipate Applicants' Claims 1-2, 12, And 20

Kato is directed to an electrode material having a "porous" base sheet comprised of a fluoropolymer binder, and a powdery electrochemically functioning material dispersed therein. An ion exchange resin, which may also contain a metal, is distributed in the pores through the surface of the porous base sheet.

Kato's base sheet, which is made from fluoropolymer binder, has no fibrils. Thus, Kato does not teach, disclose or suggest "a "polymeric sheet [with a microstructure of fibrils] having distributed in the polymer: i) inorganic particulate; ii) metal; iii) an organic polymer; or iv) a combination thereof" as recited in Applicants' claim 1.

Accordingly, at least independent claims 1 and 20 are respectfully asserted to be patentably distinct over Kato, and their dependent claims 2 and 12 are respectfully asserted to be patentably distinct over Kato for at least similar reasons.

2. Claims 1, 3-9, 11-15, 17 and 20-25 Are Patentably Distinct From Ohashi Alone Or In Combination With Laconti or Koslow

Applicants' independent claims 1 and 20 recite, *inter alia* "integral, substantially air impermeable" polymeric or composite "membrane[s]" comprising a "polymeric sheet [with a microstructure of fibrils] having distributed in the polymer: i) inorganic particulate; ii) metal; iii) an organic polymer; or iv) a combination thereof."

Ohashi is directed to a metallized porous fluorinated resin. Ohashi describes a porous fluorinated polymer (e.g., polytetrafluoroethylene) having a hydrophilic polymer film coated on at least the inside pore surface. [Ohashi, p. 2, lines 37-38]. Then, the hydrophilic polymer film is coated with a metal film layer. [Ohashi, p. 2, lines 38-41]. These coating processes are said to provide “a *porous* fluorinated polymer material.” [Ohashi, p. 2, line 42 (emphasis added)].

Ohashi describes a use for the disclosed materials is as “gas diffusion electrodes,” which are porous in order to provide “a three-phase interface of the electrode, the reaction gas, and the electrolyte.” [Ohashi, p. 8, lines 33-36]. Thus, Ohashi fails to teach, disclose or suggest “[a]n integral, substantially air impermeable polymeric membrane” as recited in Applicants’ claim 1.

The office action asserts that “[Ohashi] teaches the sheet has a precious metal, such as platinum (p. 7, lines 19-28). It teaches inorganic particular or metal distributed on the polymeric sheet (p. 2, lines 35-45).” [2/1/06 Office Action at p. 4].

Applicants note that the office action did not assert that Ohashi discloses metal is “distributed in the polymer” as recited in Applicants’ claim 1. Applicants’ review of Ohashi finds no such disclosure.

To the contrary, Ohashi’s metal forms an external coating or film on the porous fluorinated resin. For example, Ohashi describes that “[t]he thickness of the metal film in the chemical plating is normal approximately 10 Å to 1 µm and in particular 500 Å to 4000 Å.” [Ohashi, p. 8, lines 8-9]. Likewise, Ohashi’s practical example 1

describes that a circular PTFE film is coated on at least the inside pore surface of the PTFE film with a hydrophilic copolymer film of tetrafluoroethylene and vinyl alcohol, [Ohashi, p. 12, lines 25-33], and then is plated with nickel. [Ohashi, p. 12, lines 39-42]. “The thickness of the plating that surrounded the knots and fibers at this point was approximately 100 Å.” [Ohashi, p. 12, lines 42-43]. As is apparent from the above discussion, the hydrophilic polymer film and the metallic layer are deposited on the surface of the PTFE film.

The two passages cited by the office action do not describe metal is “distributed in the polymer” as recited in Applicants’ claim 1. The passage at page 2, lines 35-45 recites the “present invention.” It says that a porous fluorinated polymer material may be coated with hydrophilic polymer on the “inside surface” of the pores and then may be “plated” to provide a “metal film ... on the surface inside of the pores.” [Ohashi, p. 2, lines 37-41]. The passage at page 7, lines 19-28 chemical plating or bonding of metal to the inside surface of the pores onto the hydrophilic polymer.

Thus, Ohashi also fails to teach, disclose or suggest a “polymeric sheet [with a microstructure of fibrils] having distributed in the polymer: i) inorganic particulate; ii) metal; iii) an organic polymer; or iv) a combination thereof” as recited in Applicants’ claim 1.

Laconti and Koslow were, instead, asserted to disclosure features recited in dependent claims 3-9. Without commenting on those assertions, Applicants note that these secondary references were not alleged by the office action to alleviate the above-

described deficiencies in Ohashi with regard to Applicants' claim 1. As discussed below, Laconti and Koslow contain no such disclosure.

Laconti is directed to a thermally stabilized, reduced metal oxide electrocatalyst. Laconti describes *gas permeable* electrodes formed from a blend of Teflon binder particles and catalytic particles that are applied to an ion-exchange membrane. [Laconti, p. 3, lines 6-27]. Thus, Laconti fails to teach, disclose or suggest “[a]n integral, substantially air impermeable polymeric membrane” as recited in Applicants' claim 1. Moreover, Laconti's electrodes do not have a polymeric sheet with fibrils. Thus, Laconti also fails to teach, disclose or suggest a “polymeric sheet [with a microstructure of fibrils] having distributed in the polymer: i) inorganic particulate; ii) metal; iii) an organic polymer; or iv) a combination thereof” as recited in Applicants' claim 1.

Koslow is directed to a process for the production of three-phase composite materials; the three phases being binder, air (or gas) and “primary particles.” [Koslow, Col. 4, lines 39-41]. Each and every one of Koslow's 87 claims is directed to “porous composite articles.” Thus, Koslow fails to teach, disclose or suggest “[a]n integral, substantially air impermeable polymeric membrane” as recited in Applicants' claim 1.

Accordingly, at least independent claims 1 and 20, and their dependent claims 2-17, and 21-25 are respectfully asserted to be in condition for allowance.

3. Claims 10, 18-19 and 26 Are Patentably Distinct From Ohashi Alone Or In Combination With Laconti or Koslow

Applicants' claim 10 recites:

10. A polymeric membrane for use in an electrochemical apparatus or process comprising:

- a) a polymeric sheet comprising polymer and having a porous structure,
- b) the polymeric sheet having distributed in the polymer:
 - i) inorganic particulate;
 - ii) metal;
 - iii) an organic polymer; or
 - iv) a combination thereof, and
- c) said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process, wherein the polymeric sheet is expanded porous PTFE, and said ion-exchange resin fills substantially all pores of the expanded porous PTFE.

Likewise, Applicants' independent claim 18 recites "said porous structure being substantially filled with a polymeric gel that contains electrolyte."

As to Ohashi, the office action concedes that Ohashi fails to disclose an ion-exchange resin at least partially filling the porous structure as recited in Applicants' claim 1. [2/1/06 Office Action at p. 5 ("[Ohashi] does not teach a porous structure at least partially filled with an ion-exchange resin to provide ionic conductance.")]. Despite this concession, the office action alleges that "[Ohashi] teaches the ion exchange resin is fluorinated." [2/1/06 Office Action at pp. 4-5 (citing the disclosure at page 2, lines 35-45 of Ohashi)].

Applicants' review of Ohashi finds no disclosure of ion exchange resin or polymeric gel that contains electrolyte. The words "ion-exchange resin" never appear in Ohashi's disclosure. The passage in Ohashi identified in the office action as allegedly disclosing an ion exchange resin is the "Summary of the Invention" section, which merely discloses hydrophilic polymeric coatings bonded to pores of a porous fluorinated polymer material and then plated with a metal film on the surface inside of the pores. Accordingly, Ohashi fails to teach, disclose or suggest "said porous structure being at least partially filled with an ion-exchange resin to provide ionic conductance for use in the electrochemical apparatus or process, ... said ion-exchange resin fills substantially all pores of the expanded porous PTFE" as recited in Applicants' claim 10.

Accordingly, at least independent claims 10 and 18, and their dependent claims 19, and 26 are respectfully asserted to be in condition for allowance.

Applicants have chosen in the interest of expediting prosecution of this patent application to distinguish the cited documents from the pending claims as set forth above. These statements should not be regarded in any way as admissions that the cited documents are, in fact, prior art. Applicants also have not specifically addressed the rejections of the dependent claims. Applicants respectfully submit that the independent claims, from which they depend, are in condition for allowance as set forth above. Accordingly, the dependent claims also are in condition for allowance. Applicants, however, reserve the right to address such rejections of the dependent claims in the future as appropriate.

CONCLUSION

For the above-stated reasons, this application is respectfully asserted to be in condition for allowance. An early and favorable examination on the merits is requested. In the event that a telephone conference would facilitate the examination of this application in any way, the examiner is invited to contact the undersigned at the number provided.

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED FOR THE TIMELY CONSIDERATION OF THIS AMENDMENT UNDER 37 C.F.R. §§ 1.16 AND 1.17, OR CREDIT ANY OVERPAYMENT TO DEPOSIT ACCOUNT NO. 13-4500, ORDER NO. 0769-4624US5.

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Respectfully submitted,
MORGAN & FINNEGAN, L.L.P.

By: *Matthew K. Blackburn*

Matthew K. Blackburn
Registration No. 47,428

Correspondence Address:

MORGAN & FINNEGAN, L.L.P.

3 World Financial Center

New York, NY 10281-2101

(212) 415-8700

(212) 415-8701

Telephone

Facsimile